A CASE OF LATERAL HOMONYMOUS HEMIANOPSIA.

By THEODORE DILLER, M.D.,

Fellow of the Pittsburgh Academy of Medicine

CLINICAL SUMMARY: *Blindness of left lateral half of both retinæ coming on suddenly during great mental excitement in a woman aged* 53, *who has had three cerebral hæmorrhages; persistence of the condition since January*, 1890.

MRS. S., an exceedingly stout and plethoric woman aged 53, suffered from an attack of monoplegia involving the left arm fourteen years ago. The condition gradually passed away so that at the end of a few months she was in her usual good health. After recovering the use of her arm, she considered herself well until January, 1890, when her eye-trouble became manifest. About this time she was in great trouble about some domestic matters, and, at times, took part in exciting discussions. One day, after being engaged in a spirited debate, while in a highly emotional state, she noticed, for the first time, that she could not see persons to her right unless she turned her head in that direction much further than usual. This symptom has persisted, without variation, up to the present time. (Aug. 15, 1891).

February 9, 1890, she became paralyzed in the right arm and, at the same time, suffered from a considerable degree of aphasia. These symptoms disappeared in the course of a few weeks. She then considered herself again well, but for the visual defect to which she had become accustomed and which caused her but little trouble.

In October, 1890, she was seized with an attack of unconsciousness lasting about an hour. Upon return of consciousness she found that she was unable to move her left arm or leg. She was hemiplegic. By January, 1891, at which time I was called in consultation with Dr. Sowash to see her, a certain amount of motion had returned in the leg, but not enough to enable her to walk. The paralysis in the arm was still almost complete. Since January electricity has been applied to the paralyzed parts, while strychnia and the iodide of potassium have been given by the mouth. This treatment has been followed by a considerable increase of power in the leg and by a slight increase in the arm. I fear, however, the arm will not regain much more strength as a certain degree of atrophy of the muscles is now apparent.

On my first visit I carefully examined her eyes and found the following conditions present: Pupils equal in size, normal in contour; equally responsive to light, reflex and accommodation; no retinal changes. Patient reads newspaper held at the ordinary distance with ease. Field of vision apparently about the same for each eye; able to see objects only when they are placed somewhere within the left lateral halves of the fields of normal vision. She can see nothing placed within the normal field of vision for the left lateral halves of the retinæ. The case is therefore one of right homonymous hemianopsia.

In the latter part of June, Dr. W. F. Robeson examined the patient's eyes and made the following report as to their condition:

I submit the following report on Mrs. S——'s case:

Externally there is nothing odd or peculiar about either eye to attract attention.

Conjunctiva, normal.

Pupilary distance, 61 mm.

Irides: Both irides respond quickly to light and about equal in color.

Pupils: Equal in size; fail to respond to Wernicke's inactive test. + 1.00 D.

Field of Vision: Shown in accompanying diagrams.

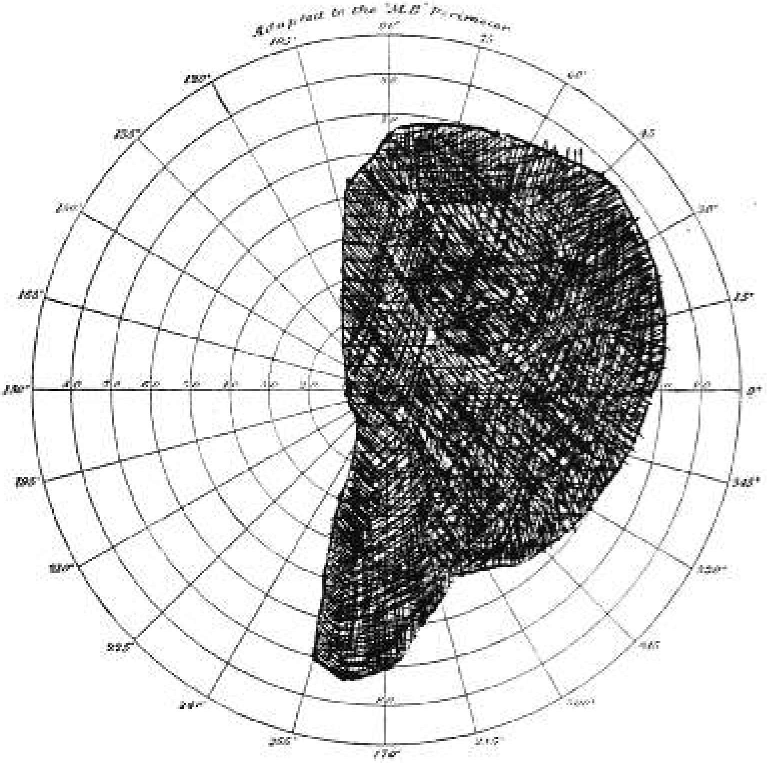
Ophthalmoscopic examination:

O. D. Media clear. Nerve oval; axis, 90°; normal in size; color is pale, but no evidence of atrophy. Vessels small, as a rule. Scleral ring all around nerve. No choroidal crescent. Retina and choroid, to all appearances, normal.

O. S. Media clear. Nerve sound and paler in color, but no atrophic changes. Vessels small in diameter. Scleral ring all around, but no choroidal crescent. Retina and choroid, to all appearances, normal. + 1.00 D.

REMARKS.

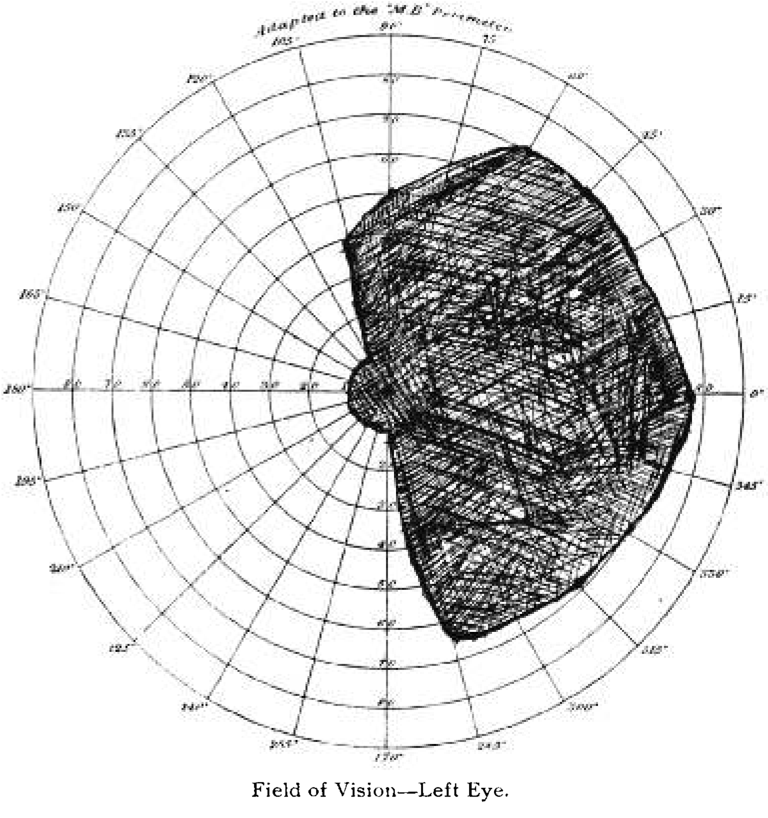
The two attacks of monoplegia and one of hemiplegia must have been caused by cerebral hæmorrhages. Therefore it seems to me the conclusion is most plausible that the sudden partial loss of vision was due to the same cause. The seat of the lesion must be in the occipito-angular region of the cerebrum or else at some point in the tract which connects the visual center with the eye-ball.



Field of Vision—Right Eye.

Let us briefly consider, in the light of physiological knowledge and clinical experience, the symptoms which would be expected to result from lesion of the visual centre, the fibres connecting it with the retina and the intermediate ganglia concerned in vision.

A lesion confined to the angular gyrus will, according to Ferrier,[1] produce temporary amblyopia of the opposite eye. The destruction of the optic lobes alone by this experimenter produced negative effects upon vision. But the entire destruction of the occipito-angular region, according to the same author,[2] will produce permanent lateral hemiopia to the opposite side. Schäfer and Horsley,[3] in their experiments, found that this hemiopia was nearly always temporary. Mills[4] believes that clinical and pathological



Field of Vision—Left Eye.

---

[1] Functions of the Brain. Second edition, p. 287.

[2] *Op. cit.*

[3] Brain, Jan., 1888.

[4] Cerebral Localization, p. 250.

records have established the fact that "in the cuneus and its immediate neighborhood the visual half-centre for retinal sensations is located." He cites, in support of this proposition, cases reported by Jastrowitz,[5] Habb,[6] Huguenin,[7] Monakow,[8] Seguin[9] and Hun.[10] Mills' view has also in its support, the older observations of Charcot.[11] Hun, Noyes,[12] and Mills are further in accord in believing that definite parts of the occipito-angular region are in relation with corresponding quadrants of both the retinæ. It may be found subsequently that they are in relation with even smaller sections of the retinæ (eighths). Hun reports a very clear case in support of this theory. None of these experimenters or observers records an instance of hemiopia of *one eye alone* as the result of destruction, removal or disease of the whole or part of the cortical visual centre.

The greater part of each optic nerve decussates to the opposite chiasma. A smaller number of fibres do not decussate. "Secondary atrophy of the optic tracts which ensues on the enucleation of the eye-ball involves the corpus geniculatum externum, the pulvinar of the optic thalamus and the superficial gray layer and the superficial medullary fibres of the anterior tubercles of the corpora quadrigemina."[13]

The annexed figure will serve to represent diagramatically these various centres and their anatomical connections, together with the decussation in the chiasma. Although it is still doubted by a few that the optic nerves decussate as represented in the diagram, the preponderance of evidence is now so overwhelmingly in favor of such a decussation that this must be considered as proven to be the arrangement of fibres in the chiasma. The experiments of Gud-

---

[5] Centralb. für prakt. Augenheilk., Dec. 1879.

[6] Klinische Monatsblatter f. Augenheilk., xx., 141, 1882.

[7] Archiv. f. Psychiat. u. Nervenkrankheiten, Bd. 16, s. 166.

[8] Jr. Nerv. and Ment. Dis., Jan., 1886, 1–38.

[9] Am. Jr. Med. Sc., Jan., 1887, 140–168.

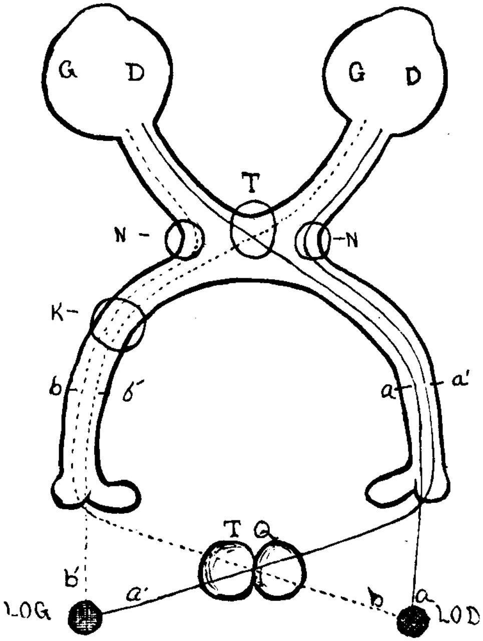
[10] Ibid.

[11] Leçons sur les Localizations dans les Invalides du Cerveau, pp. 124–5–6.

[12] New York Med. Rec., May, 1890.

[13] Ferrier, Functions of the Brain, second edition, p. 155.

SCHEME OF DECUSSATION OF THE OPTIC TRACTS (AFTER CHARCOT).[14]



T, semi-decussation in the optic chiasm. T Q, decussation posterior to the corpora geniculata. a'b, fibres which do not decussate in the chiasm. b'a, fibres which undergo decussation in the chiasm. b'a', fibres coming from the right eye which meet in the left hemisphere LOG. LOD, right hemisphere. K, lesion of the optic tract, producing right lateral hemiopia. LOG, a lesion at this point producing right amblyopia. T, lesion producing temporal hemiopia. NN, lesion producing nasal hemiopia.

den,[15] Gauser[16] and Monakow[17] are in accord in demonstrating that the enucleation of one eye is followed by partial atrophy in both optic tracts. Moreover, Ferrier[18] supports the view of Hannover that the direct fibres lie on the corresponding side (fasciculus lateralis) of the chiasma and optic nerve. Delbrück[19] recently reported a case of great interest in this connection which materially strengthens this view of the anatomical relations. In an insane man, aged 70, the left optic nerve was completely degenerated, while upon the right side only *one-half the nerve was similarly affected;* only the right non-decussating bundle was found normal. This writer, in common with many other authorities, holds that the decussating fibres occupy the free border of the tract and the non-decussating fibres the interior.

---

[14] Drawn by Wm. B. Henderson, M.D., Pittsburgh.

[15] Archiv. f. Psychiatrie, 1870.

[16] Ibid, 1882.

[17] Ibid, 1883.

[18] Functions of the Brain, second edition, p. 155.

It may now be considered as pretty well proven that in the optic nerve the decussating and non-decussating fibres occupy the inner and outer sides of the nerve respectively.

In view of the above considerations it seems certain that the lesion in the case under consideration must be in the left optic tract or in the continuation of fibres up to the occipito-angular region. The failure to elicit Wernicke's hemiopic pupillary inaction symptom would indicate that the tract is in normal condition. The lesion must therefore be either in the corpus geniculatum, the pulvinar, the corpora quadrigemina or the occipito-angular convolutions. From the clinical fact that the last named region is the most frequent seat of hæmorrhage of all those mentioned, the probabilities would indicate that the lesion is there situated. Moreover, it is doubtful whether a lesion in any one of the intermediate ganglia would have produced such complete hemiopia.[20]

---

[19] Archiv f. Psychiatrie, Bd, xxi., Hft. 3.

[20] Dr. Samuel Ayers, who saw the case since the above was wrltten, concurs in diagnosis.